



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/647,163	08/21/2003	Hui-Ling Lou	MP0284	1606
7590 06/09/2008				
FISH & RICHARDSON 3300 DAIN RAUSCHER PLAZA 60 SOUTH SIXTH STREET MINNEAPOLIS, MN 55402			EXAMINER NGUYEN, HANH N	
			ART UNIT 2616	PAPER NUMBER
			MAIL DATE 06/09/2008	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/647,163

**Applicant(s)**

LOU ET AL.

**Examiner**

Hanh Nguyen

**Art Unit**

2616

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on Response filed 3/11/08.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3, 5-27, 29-51, 53-75 and 77-104 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-27, 29-51, 53-75 and 77-104 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Arguments***

Applicant's arguments filed on 3/11/08 have been fully considered but they are not persuasive.

In the Remark, regarding 101 issue in claim 73, the specification describes an "information carrier" as .

Applicant argues that Kadous does not disclose receiving a preamble that includes two or more training sequences; and deriving initial channel estimates in the frequency domain with the received preamble and a stored preamble; and the OFDM as described by Kadous is not compliant to IEEE 802.11 and 802.16a.

Examiner notes that in Kadous, fig.5, from the received signal  $r(t)$  inputted into FFT ( step 20), the training sequences are extracted from preamble of data burst ( see step 22 and col.9, steps 20, 22; lines 55-60). In col.5, lines 30-55, the training sequences are training sequences [A,B] and [C,D] and any number of training sequences may be used.

Next, since the claim does not indicate how the initial channel estimate is derived between the received preamble and a stored preamble, Still refer to fig.5, step 24, col.9, lines 55-60, A least square channel estimate is obtained by dividing the received training sequence by the exact training sequence in the LS estimator 56 ( see fig.2, col.5, lines 15-20.

Next , the system of Kadous is OFDM. According to Wikipedia encyclopedia which indicates that OFDM is applied in 802.11a such as wireless LAN radio interface;

WIMAX and HIPERLAN/2; and 802.16 such as wireless MAN/Fixed broadband wireless access and HIPERMAN. Therefore, it is a well-known in the art that the OFDM receiver and transmitter of Kadaous is compliant to IEEE802.11a and 802.16. The specification in paragraphs[0004], [0005] and [0011] also indicates that the OFDM system is applied in 802.11a/g system and 802.16a.

Regarding 101 issues in claim 73, "the information carrier" is a tone/ waveform/signal. "A computer program product" is a software but is not described in the specification, Therefore, "A computer program product tangibly embodied in an information carrier" is not statutory.

#### ***Claim Rejections - 35 USC § 101***

Claim 73 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Regarding claim 73, "the information carrier" is a tone/ waveform/signal. "A computer program product" is a software but is not described in the specification. Therefore, "A computer program product tangibly embodied in an information carrier" is not statutory.

In addition, Examiner believes "a computer program product" is not described in the specification. Applicant is required to indicate where in the specification "a computer program product" is described. Claims 74, 75, 77-96, 103 and 104 are also rejected because they depend on claim 73 respectively.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 5-27, 29-51, 53-75, 77-104 are rejected under 35 USC 103(a) as being unpatentable over Kadous ( US Pat. 6,996,195 B2 in view of Chuang ( US Pat. 7,099,413 B2).

\*In claims 1, 7, 8, 25, 31, 32, 49, 73, 79, 80, Kadous discloses a method of obtaining channel estimates ( see Abstract; channel estimation using OFDM ) comprising receiving a preamble across a channel, the preamble including two or more training sequences (see fig.1, col.4, lines 50-65; receiver 100 receives a signal  $r(t)$  over a radio channel. The signal comprises training sequences [A,B] and [C,D]; see col.5, lines 30-55, Further in fig.5, the training sequences are extracted from preamble of data burst; see col.9, lines 55-60); performing a Fourier transform of the training sequences ( see fig.1A, col.4, line 60 to col.5, line 5; FFT 34 converts the signal from time domain to frequency domain); deriving initial channel estimates in the frequency domain with the received preamble and a stored preamble ( see fig.2; col.5, lines 15-20; channel estimator 36 receives frequency domain signal and determine channel estimation with a stored training sequence in buffer 54( fig.2) ); receiving data symbols across the channel ( see fig.1, col.5, lines 35-40; the received training sequences of length N

inherently include data symbols as being well-known in the art); demodulating and decoding the data symbols ( see fig.1; col.4, lines 50-65 and col.5, lines 10-12; demodulator 44 and decoder 50 demodulates the signal to reproduce the original signal).

Kadous does not disclose updating the channel estimate using the demodulated and decoded data symbols. Since it is not specifically described how the claimed " updating the channel estimation" is performed, therefore, "updating the channel estimation" is broadly understood as " repeating the channel estimation" after demodulating, decoding the data symbols .

Chuang et al. discloses updating the channel estimate using the demodulated and decoded data symbols ( see fig.1A, col.2, lines 5-20; at receiver 140, transformed signal after being demodulated, decoded is fed back to channel estimator 165 which repeats the signal channel estimations, demodulations and decode). Therefore, it would have been obvious to one skilled in the art apply the teachings of Chuang et al. into Kadous to update the demodulated and decoded data symbol by using channel estimation. The motivation is improve channel quality such as minimize error rate of received data symbol.

In claims 18, 42, 90, Kadous disclose that the data symbol is decoded using Viterbi algorithm ( see fig.1, Viterbi decoder 50).

In claims 2, 17, 26, 50, 74, the limitation has been disclosed in claim 1 ( See claim 1, Chuang et al. fig.1A, receiver 140).

In claims 19, 20, 21, 22, 24, 43, 45, 46, 48, 91, 93, 95, 97, Kadous disclose exponential update, least mean square update (see fig.2, least mean square estimator 56). In claim 41, the limitation of this claim has been addressed in claim 1.

In claims 98-104, Kadous does not explicitly disclose the channel estimation is compliant with IEEE 802.11a, IEEE 802.16a. According to Wikipedia encyclopedia which indicates that OFDM is applied in 802.11a such as wireless LAN radio interface; WIMAX and HIPERLAN/2; and 802.16 such as wireless MAN/Fixed broadband wireless access and HIPERMAN. Therefore, it is a well-known in the art of Kadous that the OFDM receiver and transmitter is compliant to IEEE802.11a and 802.16.

In claim 11, kadous discloses interpolation channel estimation ( see fig.1, interpolator 60).

claims 5, 6, 9-16, 23, 27, 29-51, 53-72, 75-78, 81-89 are also rejected due to their dependency to parent claims.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hanh Nguyen whose telephone number is 571 272 3092. The examiner can normally be reached on Monday-Thursday from 8:30 to 4:30. The examiner can also be reached on alternate

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynn Field , can be reached on 571 272 2092. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Hanh Nguyen/

Primary Examiner, Art Unit 2616